Does Taping of the Annular Pulleys of the Fingers Improve Grip Strength in Climbers?

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Indoor sport climbing will debut as a new Olympic discipline at the 2020 summer games in Tokyo. The annular pulleys of the fingers are the most commonly reported injured structure in climbing. There are five annular pulleys within each finger and referred to as the A1, A2, A3, A4 and A5. The A2 and A4 structurally maintain the integrity of the flexor tendon system due to their direct attachment to the underlying bone. The A2 is the largest pulley and capable of withstanding up to 400 newton of force. Anecdotal evidence suggests some climbers apply athletic tape to the fingers both as a prophylactic measure to prevent annular pulley injury and to increase their grip strength capability. Grip refers to the method by which the climber holds the climbing surface to facilitate movement. The type of grip the climber uses largely depends on the size and shape of the available hand-holds, the climber's body orientation in relation to the climbing surface and the strength of the climber. A common type of grip used in climbing is the closed crimp position. In this position the proximal interphalangeal joint is flexed at approximately 100° and the distal interphalangeal joint is hyperextended at approximately 210°. The distal palmer surface of the index, middle and ring fingers are normally in contact with the surface and the thumb often placed over the dorsal surface of the index finger to generate more force. The aim of the study was to investigate if taping the fingers increased crimp grip strength in uninjured climbers. Following ethical approval by the Leeds Beckett University research ethics committee, 50 active climbers (25 male, 25 female) were recruited. Using a within subject repeated measures design, a Jamar plus digital dynamometer was used to measure crimp grip strength (3 trial mean, dominant and non-dominant hand, tape and no-tape). The order of conditions was randomised and each participant performed each grip. The tape condition involved applying a 10cm piece of 1" Lewis-Plast zinc oxide tape to the proximal interphalangeal joint of the index, middle and ring fingers using the H-tape method. There was no statistically significant difference ($p = 0.922$, paired t-test) in crimp grip strength between tape (24.03 ± 6.9kg) and no tape (23.99 ± 7.2kg) conditions. Taping the annular pulleys did not increase crimp grip strength as measured using hand held dynamometry in uninjured climbers.